



**Report of the Nutrition Committee
Baguio, Philippines, 23-28 February 1948**

**NUTRITION PROBLEMS OF
RICE-EATING COUNTRIES IN ASIA**

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WASHINGTON, U. S. A.

JUNE 1948



22500046562

Report of the Nutrition Committee
Baguio, Philippines, 23-28 February 1948

NUTRITION PROBLEMS OF
RICE-EATING COUNTRIES IN ASIA

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WASHINGTON, U. S. A.

JUNE 1948

WELLCOME INSTITUTE LIBRARY	
Coll.	welMOmec
Call.	pam
No.	QU 145
	1948
	F68 n

CONTENTS

Introduction	1
I. Improvement of Rice	2
II. Improvement of Rice Diets	8
III. The Feeding of Vulnerable Groups	13
IV. Nutrition Education	16
V. The Composition of Tropical Foods	17
VI. National Nutrition Organizations or Committees	19
VII. Regional Activities	20
Appendices	
A. Problems Calling for Study and Action	22
B. Members of the Nutrition Committee	23

INTRODUCTION

THE Nutrition Committee was convened, in accordance with the recommendations of the Rice Study Group and the Third (1947) Annual Conference of the Food and Agriculture Organization of the United Nations,¹ to consider nutrition problems in the East with special reference to rice. It was the first regional nutrition conference or committee to be convened by FAO.

Much of this report is devoted to methods of improving rice and rice diets, but important questions such as food composition, feeding of vulnerable groups, and nutrition education are also considered. A number of specific recommendations are made calling for action on the part of Governments, and "background" information to guide Governments in taking such action is included.

The report is also intended to provide a basis for an effective regional nutrition program for FAO. Broadly this should be concerned with the elimination of waste of rice at all stages between production and consumption; the improvement of the nutrient content of rice by better milling practices; the extended use of parboiled rice and the introduction of enriched rice; and the improvement of rice diets by suitable supplements and substitutes for rice. Arising out of this general program there are various specific activities requiring attention on the part of FAO, such as the study of suitable and easily applied methods of thiamine estimation.

Some of the recommendations made in the report are not new, having been made before by international and national groups. The time has come, however, for a new and vigorous campaign to raise nutritional levels in rice-eating countries along lines such as those suggested in this report. The solution of many of the problems discussed may present great difficulties but can be reached by intensive work and co-operative effort.

¹ FAO, *Report of the Rice Study Group*, Washington, U. S. A., July 1947; *Report of the Third Session of the Conference*, Washington, U. S. A., December 1947.

I. IMPROVEMENT OF RICE

Suggested nutritional level for milled rice

The Committee is of the opinion that a thiamine content of 1.8 micrograms per gram for all milled rice as purchased should be the ultimate goal. The thiamine content of rice is itself highly important because lack of thiamine causes beri-beri, and it can also serve as a convenient index of the degree of retention of other nutrients. In selecting this level, allowance is made for subsequent losses taking place during household preparation, i.e., it is sufficiently high to ensure that the rice as finally consumed will not be dangerously poor in thiamine. However, at the present time, there are many difficulties, outlined under the heading "milling" below, which militate against the immediate adoption of such a level. The Committee, therefore, recommends that a content of 1.5 micrograms of thiamine per gram of milled rice be at present accepted as a minimum, with the proviso that when improved milling or processing of rice permits, the higher level be adopted.

Estimation of thiamine

If thiamine content is to be used as an index of the nutritive value of rice, a simple, convenient, and easily standardized method of estimating this vitamin is clearly needed. Numerous methods of estimating thiamine in cereals have been evolved, but there is at present no general consensus as to the most satisfactory and convenient method for application to rice. Further research may be needed to develop a method which would be fully satisfactory in practice.

FAO should make available to nutrition research laboratories in the East information about recently evolved methods of thiamine estimation in cereals. The problem of selecting or developing a suitable method for routine thiamine estimations in rice milled to various degrees should be investigated by laboratories in different countries. A suitable laboratory in the East, working in association with FAO, might serve

as the co-ordinating center for such an investigation. Collaborative studies of methods of thiamine estimation in wheat which have already been made would serve as a guide for similar studies on rice.

Milling

Some 15 percent of the protein present in husked rice may be lost in milling. The percentage loss of certain vitamins is greater; for example, about 75 percent of the thiamine originally present may be removed by milling. Typical machine-milled raw rice usually contains less than 1.0 microgram of thiamine per gram.

The production of rice which retains 1.8 micrograms per gram of this vitamin raises a number of difficult problems. In the first place, rice which is undermilled to this degree will not keep as well as highly milled rice in the poor storage conditions at present generally found in rice-producing countries. The keeping qualities of such rice can, however, be greatly improved if moisture content is kept low and other conditions of storage are satisfactory. Secondly, undermilled rice is in general less acceptable to the consumer than highly milled rice.

In many parts of the East, the design of rice mills has not been appreciably changed for a considerable number of years. As a result of the war, a large proportion of mills are in a worn-out state and require extensive repair and renovation. The processing of rice in such mills leads to considerable losses of human food, e.g., because of the high percentage of "breakages." The development of the rice-milling industry in the East along improved and scientific lines would minimize losses of rice during milling and facilitate the production of rice with a nutritional value conforming to the standard referred to above. Attention may be drawn to the possibility of milling rice in such a way that the portions of the grain richest in vitamins are retained in the milled product, while at the same time the latter is acceptable to the consumer in respect of appearance and flavor.

The Committee, while fully aware of the difficulties involved, strongly emphasizes the need for modernizing the rice-milling industry in order to facilitate the attainment of these objectives. It specifically recommends that investigations of the design of rice mills and milling practices should be undertaken by engineers and nutrition experts, working in close collaboration, with the object of producing acceptable rice of satisfactory nutritive value.

Parboiled rice

Milled parboiled rice contains more thiamine and other nutrients than milled raw rice, and is not depleted of nutrients to the same extent by household washing. Fewer breakages occur during the milling of parboiled rice than during the milling of raw rice.

Parboiled rice, however, is not liked by people in certain countries who are accustomed to raw rice, because of differences in color, flavor, and consistency of the cooked product. Another reason for its unpopularity is that it is often prepared commercially in a most unsatisfactory manner, which results in a product unattractive in appearance and taste.

The Committee recommends that improved methods of parboiling should be investigated with the aim of producing cheaply rice which has the valuable nutritive properties characteristic of parboiled rice, but which at the same time is acceptable in rice-eating areas in general. Consumer trials with such rice should be carried out in different countries and the results made available by FAO to other rice-eating countries.

“Converted” rice is essentially similar to parboiled rice in its nutritive properties, and the Committee considers it an acceptable product. The plant required for rice “conversion” is, however, elaborate and expensive, and in many rice-eating countries the most satisfactory way of encouraging the use of parboiled rice is likely to be the modification and improvement of simple parboiling methods in current use.

Washing and cooking

The washing and cooking of “raw” rice by methods commonly followed in rice-eating areas lead to serious depletion of calories and nutrients. Loss of calories may be from 10-15 per cent; of protein 10 per cent; and of thiamine as much as 80 per cent. Any improvement in the nutrient content of rice prior to household preparation, attainable by any known method, may be nullified by the vigorous washing of rice with subsequent discarding of cooking water. Limited washing and suitable cooking methods will, on the other hand, very substantially reduce losses. Improvement in this direction would have the effect of increasing the total amount of food available in rice-eating areas.

The Committee realizes the difficulties of influencing time-honored household methods of preparing rice for consumption and recognizes the need for washing out the dirt and

other impurities present in most rice as sold. It emphasizes the importance of "protecting the consumer against himself" by supplying him with rice which is relatively free from impurities and hence requires less vigorous and extensive washing. The use of parboiled rice also minimizes the depleting effects of washing.

Improvement in household methods of preparing rice, including methods of washing, with a view to the greater retention of calories and nutrients, can be hastened by suitable educational campaigns. Rice should not be cooked in an excessive quantity of water, which is usually discarded after cooking. Good methods of steaming also conserve nutrients in rice. Any educational campaign must, of course, be related to the customs of the country or area concerned and be based on full knowledge of existing methods of household preparation.

Broken rice

It appears that consignments of rice sent to deficit countries under the present allocation arrangements often contain a high percentage of screened broken grains and sweepings, of which only a small proportion are likely to be used as human food. Rice containing broken grains and particularly screened broken grains tends to be washed more vigorously than good rice, and nutrients are more readily extracted from broken particles than from intact grains. Hence the presence of a high proportion of broken rice in consignments sent to countries reduces the nutritive value of the rice as consumed.

For these reasons, it is undesirable that supplies of rice allocated to deficit countries should include screened broken rice, so-called "brewers rice," and sweepings.

The enrichment of rice

The term "enrichment" is applied here to the addition of a nutrient or nutrients to rice, and does not refer to any specific method of enhancing the nutritive value of rice. Discussion of the technique of enrichment and the technical problems involved is outside the scope of the present report. It is sufficient to say that methods of enriching milled rice with certain nutrients have already been developed and trials of enriched rice are being made, or are projected, in certain rice-eating countries.

The Committee considers that rice enrichment can be of value as an immediate measure for attacking deficiency diseases. It should, however, be regarded as an expedient which

does not remove the need for general improvement of rice diets in other ways. Enrichment is likely to prove particularly useful in areas in which beri-beri is an important public health problem.

Ideally, the choice of nutrients for enrichment should be related to the deficiencies found in the diet of the area into which it is proposed to introduce enriched rice. The Committee is, however, aware of the technical and other difficulties limiting the range of nutrients which can at present be used in enrichment. Thiamine is one of the nutrients required when the bulk of the diet consists of highly milled raw rice and beri-beri is prevalent. Ariboflavinosis is among the most important of deficiency states in many rice-eating countries, and the value of including riboflavin in enriched rice in such circumstances is evident. The difficulty, however, arises that the addition of riboflavin to the grains forming the so called "pre-mix"² in the enrichment process gives the premix a strong yellow color, and consumers might remove the colored grains to improve the appearance of their rice. This tendency could perhaps be minimized by education.

In current enrichment procedures certain nutrients needed by rice eaters are, for various reasons, not added. Among these are vitamin A and calcium. They also include various vitamins of the B₂ group in addition to riboflavin, lack of which may give rise to deficiency states in rice-eating populations. On the other hand, enrichment with iron, now added to the premix in one of the commercial enrichment processes, cannot be regarded as an important necessity, there being little convincing evidence that average rice diets are deficient in iron. Since deficiency of calcium is an important defect of rice diets, attention should be given to the problem of increasing the calcium content of rice by some suitable enrichment process.

The results of any field experiments with enriched rice should be carefully recorded for the benefit of rice-eating countries and made generally available by FAO. Satisfactory information about the effect of the introduction of enriched rice on the incidence of beri-beri, and in particular infantile beri-beri, would be most valuable.

² The premix consists of ordinary white milled rice which is impregnated with a concentrated solution of the vitamins and/or minerals chosen for enrichment. The impregnated grains are coated with film-forming edible substances which protect the vitamins against deterioration and prevent substantial losses during washing. The final enriched product is prepared by blending the premix with rice in such proportions as to give the mixture the nutrient content considered desirable on nutritional grounds.

Variation in the nutritive value of rice as grown

The nutritive value of food plants is influenced by variety, climate, soil conditions, and methods of cultivation. From the standpoint of nutrition, it would obviously be advantageous if rice superior to the average in its content of one or more important nutrients could be produced through the study of these factors. It was with this idea in mind that the Rice Study Group suggested that "the comparative value of varieties of rice produced in different areas" should be considered by the Nutrition Committee.

While available literature on the effect of variety, etc. on the nutrient content is scanty, there is some evidence that desirable improvements may be achieved. The whole subject requires further and more detailed research. In studying the effect of any given factor, e.g. variety, on nutrient content, all other variable factors must be kept constant. Before any "nutritionally superior" variety of rice—now available or developed by further research—could be recommended for widespread cultivation, consideration would have to be given to yield per acre, resistance to parasites, milling qualities, etc. Yield per acre in terms of calories is of primary importance at the present time.

It must, however, be stressed that any improvement in the nutrient content of rice which might be achieved along these lines is far outweighed in importance by the effect of processes to which the rice is subjected after it has been harvested. Measures for conserving the food value of rice between harvesting and consumption will be more effective in improving nutrition in rice-eating areas.

II. IMPROVEMENT OF RICE DIETS

In the previous section methods of conserving or increasing the nutritive content of rice itself have been considered. The present section is concerned with the substitution of rice by other foods and the supplementation of rice diets, so as to improve the nutrition of rice-eaters. While many of the recommendations which follow will be generally applicable in most rice-producing countries in the East, the problem of improving rice diets must be studied in each individual country in relation to local conditions and potentialities for food production.

Deficiencies of rice diets

In the opinion of the Committee, insufficiency of the B group of vitamins is probably the most important fault of typical rice diets. Emphasis must also be laid on deficiency of vitamin A and calcium. While there is no clinical or physiological evidence that rice diets of adequate calorie value are deficient in protein, a greater intake of protein by the rice eater, and the inclusion in his diet of protein derived from foods other than rice in greater quantities, would be advantageous. This is unquestionably true as regards growing children. No satisfactory data are available about the quantities of fat needed by human beings. Fat intake in rice-eating countries is, however, considerably lower than intake in Western countries in general, and it is well known that rice-eaters do increase their fat consumption when circumstances permit. Fat facilitates the absorption of certain vitamins and "spares" thiamine. In view of these facts an increased intake of fat is desirable.

The selection of foods to improve rice diets must be based on the need for making good these deficiencies. Account must also be taken of the practical possibilities, at existing levels of economic and agricultural development, of increasing supplies of different kinds of foods.

Cereals other than rice

Cereals consumed whole or nearly so have a higher content of nutrients than rice as consumed in many rice-

eating areas. Such cereals include wheat, millets, and maize. The present shortage of rice makes it necessary to replace a proportion of rice by other cereals in certain countries and areas. While the popularization of unfamiliar cereals often presents practical difficulties, their partial inclusion in rice diets is on the whole advantageous from the nutritional standpoint.

Pulses and beans (including soyabean and groundnuts)

These foods are rich in vitamins of the B group and are a good source of protein. Their consumption should be increased with due regard to local preferences. The Committee draws attention to the methods followed in some countries by which certain foods (e. g. soyabean and groundnuts) are inoculated with fungi and are thereby rendered more palatable and digestible; the effect of such processes on nutrient content should be further investigated. The greater use of soyabean should be encouraged in countries in which it is a familiar and acceptable food and where the people know how to prepare it in palatable forms.

Vegetables and fruits

Green leafy vegetables are a good source of provitamin A (carotene), riboflavin, and calcium. Certain fruits, such as mangos and papayas, are rich in provitamin A, and it is well known that fruits and vegetables are important sources of vitamin C. In general the consumption of vegetables and fruits in rice-eating countries is insufficient, particularly in urban areas, and increased production is much to be desired, with special emphasis on those with the highest nutrient content, e.g., green leafy vegetables. The high oxalate content of some leafy vegetables may affect the availability of calcium in the diet, but in the opinion of the Committee this problem requires further study by means of human metabolism experiments; in general, green leafy vegetables may be regarded as a rich source of calcium.

Fish

Fish is of great value as a supplement to rice diets. Fish has a high protein content and when fresh contains various vitamins of the B group. Small fish consumed whole are a rich source of calcium. Potential supplies of fish in most countries in the East are large and the fishing industry

should be developed as rapidly as possible to improve the diet of the people in these countries.

Reference to fish liver oil, a rich source of vitamin A, will be found in Chapter III.

Milk, meat, and eggs

The inclusion of these highly nutritive foods in greater quantities in rice diets is much to be desired. The value of milk in the feeding of infants and children is stressed elsewhere in this report. The Committee is aware, however, that a substantial and rapid increase in the supply and consumption of these foods in most Eastern countries presents great practical difficulties, and hence lays emphasis on other means of improving rice diets to achieve rapid results.

Roots, tubers, and other starchy foods

This group, which includes potatoes, sweet potatoes, cassava, sago, bananas, and plantains, is poor in protein. There are, of course some differences in the nutritive value of various members of the group; for example potatoes and sweet potatoes contain more protein than cassava and are also a better source of certain vitamins. Cassava and sago are almost entirely carbohydrate. In practice, agricultural and climatic conditions determine which of the roots and tubers are most suitable for cultivation, and the selection of one particular root or tuber on the grounds of superior nutritive value is difficult.

Roots, tubers, and other starchy foods give high yields in terms of calories per acre. Cassava and sweet potato are important energy-yielding foods in a number of tropical countries and areas, and their extended cultivation has helped to prevent starvation during the recent period of serious food shortage. From the nutritional standpoint, however, starchy foods as a group are not a satisfactory substitute for rice because of their low protein content. If they form too large a part of the diet and intake of other foods rich in protein is low, deficiency of protein will result, with adverse effects on health and physical development. While extension of the cultivation of cassava and other starchy foods is justified as a temporary measure in times of emergency, when the need for calories is urgent, it is undesirable in the long run. Careful attention should be given to this question in formulating food production policies and programs in tropical countries. It must be emphasized that

the greater the intake of starchy foods, such as cassava, the greater the need for protein-rich foods, such as pulses and fish, to make good protein deficiency.

Rice polishings

These are used to some extent as human food in certain countries and supply vitamins of the B group and other nutrients. In most areas, however, their principal use is as feed for livestock. The Committee considers that the consumption of rice polishings could with advantage be encouraged, but only polishings prepared under hygienic conditions and free from substances which may irritate the digestive tract (e.g., rice husks) can suitably be used as human food.

Food yeast

This is a good source of riboflavin, a nutrient much needed in most Eastern countries. It is also rich in other vitamins of the B group and in protein. When properly prepared according to modern manufacturing methods, food yeast has no unpleasant taste and flavor and has been readily accepted by various groups. The Committee learns that the price of the food yeast which is at present being supplied to a limited extent to certain countries in the East is high, and emphasizes the fact that food yeast must be cheap if its use as a dietary supplement is to be extended. One useful method of supplying food yeast may be through school-feeding programs, and the possibility of increasing its consumption in this and other ways should be explored.

Coconuts

Coconuts are consumed in considerable amounts in many tropical countries. They are a very important source of edible oil, and dried coconut has a fairly high protein content. The value of coconut in various forms as a supplement to rice diets has been insufficiently investigated, and the Committee suggests that more attention should be given to this problem by nutrition research workers in rice-eating countries.

Fortification of vegetable oil by vitamin A or carotene

All vegetable oils generally consumed in the East are devoid of vitamin A activity and the possibility of fortifying them in this respect has received considerable attention in

various countries. Trials have been made with red palm oil (a rich source of carotene), preparations of carotene, and preparations of vitamin A obtained from fish-liver oil, as fortifying agents. Where edible oils reinforced by carotene or vitamin A are likely to be acceptable their use should be encouraged. The possibility that much of the vitamin A activity resulting from fortification may be lost when the reinforced oil is used for cooking must, however, be borne in mind.

Need for local approach

It should be emphasized that the above discussion of supplements to rice diets is far from comprehensive, and further study of the problem in different rice-eating areas is needed. To the greatest extent possible, deficiencies in rice diets should be made good by the use of foods which can be readily produced within rice-eating countries.

III. THE FEEDING OF VULNERABLE GROUPS

Large numbers of the poorer class children in Asia are in a condition of malnutrition. All governments obviously desire to do all that is possible for the physical well-being of children and for their mental efficiency during education. Both can be greatly improved by the provision of at least one nutritious meal daily by which known deficiencies in the usual diets of the children may be corrected. Another aim in providing a school meal is to teach proper eating habits, which may have far-reaching effects throughout the rest of life. Further, an appreciation of such habits gained by children is frequently transferred to their parents.

The vulnerable groups considered here are:

- (a) children of school age from five years and onwards,
- (b) preschool children from after infancy to school age,
- (c) infants, and
- (d) pregnant and nursing women.

Present feeding programs

A memorandum by the FAO Nutrition Division on present programs for feeding vulnerable groups in a number of countries in the region was available to the Committee. In most countries something has been done in this field, but few well-organized school-feeding programs covering large numbers of children and established on a permanent basis are in operation. While there is a widespread movement in the East to develop the feeding of the vulnerable groups, the movement is at present very limited in scope, and only a small percentage of the population is reached.

Foods of choice

The Committee unanimously agrees that the best food in the diets of infants and children is milk, but recognizes

that it is impossible to provide adequate quantities of milk to the millions of children in the vast areas of Asia. It is therefore necessary, under present conditions, to consider alternative foodstuffs.

Much attention has been paid to the possibility of preparing nutritious emulsions of pulses such as the so-called soyabean "milk." Emulsions of soyabean are usually prepared so that they contain approximately the same proportion of protein as cow's milk, and about three times as much vitamin B₁, but they lack vitamins A and D and are poor in riboflavin and calcium. More research is needed to produce a good pulse emulsion which can be a nutritive food for vast numbers of children pending the development of dairy industries. It is to be noted that an easily emulsified powder is required, since it would be impossible to distribute liquid pulse emulsions to distant areas.

The type of free meal for school children recommended by the Committee may be based on the following formula:

	(Oz.)	(Grams)
1. Cereals (cereals available, such as lightly milled rice, high-extraction wheat, millets, or other cereals)	2-1/2	70
2. A pulse	1/2	14
3. Small fish of which the whole body is eaten (such fish provide calcium)	1/4	7
4. Vegetable (green leafy vegetables preferred)	1	28
5. Oil (preferably an oil containing carotene)	1/4	7
6. Salt	1/6	5

A meal of this kind will provide about 400 calories and will contain all the essential nutrients. It should be regarded as illustrating the general pattern of a cheap school meal, and may of course be modified in various ways in accordance with local conditions and the availability of various foods. For example, a greater amount of vegetables might be included, or fruits might be supplied as an alternative to vegetables. Nutrition workers in the different countries can give advice on such questions.

When facilities are not available for the distribution of full meals, specially prepared buns, cakes, chapatties made from flour, food yeast, and other ingredients such as powdered small fish may be found satisfactory. The type of meal which can most suitably be supplied in school-feeding programs will depend on local circumstances.

Infants and preschool children are the most vulnerable groups and malnutrition is common among them. Milk is

the best food for these age groups and their needs should receive prior consideration in the distribution of available milk supplies. However, the mixed meal recommended above would do for the pre-school child in emergencies such as the present.

The provision by maternity and child welfare centers of supplementary meals to improve the nutrition of mothers and infants is strongly recommended. Use may be made of fish-liver oil in these centers as well as in hospitals and dispensaries. The Committee notes with approval that the production of shark-liver oil and other fish-liver oils has been developed in certain countries in the East.

Administration

In some countries school feeding is the responsibility of the state educational department; in others it may be largely in the hands of provincial, district, or municipal authorities. Administrative arrangements and functions differ from country to country and no general rules about desirable administrative procedures and responsibilities can be laid down. The Committee emphasizes, however, that in developing school-feeding programs consultation with nutrition workers is essential, to ensure that the meals provided fulfill nutritional requirements to the greatest possible extent. Health departments must be associated with school feeding and be in a position to advise and inspect. The assistance of agricultural and other departments in the provision of food supplies for school means is highly desirable.

The Committee points out that in some countries where school-feeding programs are well organized suitable legislation concerned with this subject has been introduced. Examples are the National School Lunch Act of the United States of America (1946) and clauses in the Education Act of 1944 of the United Kingdom.

IV. NUTRITION EDUCATION

The Committee is of the opinion that three different types of teaching are required: (1) advanced courses suitable for those who wish to become specialists in nutrition; (2) courses suitable for workers in other fields in a position to apply the knowledge obtained; and (3) popular instruction in simple terms for school children and the general public.

It feels that the difficulty of influencing established food habits has been over-emphasized but that any attempt must be thoroughly practical and based on a knowledge of local foods and local cultural and dietary practices. While field demonstrations by specially trained personnel are much more likely to be effective than posters and exhortations, all methods of educating the public should be utilized. Nutrition education should form part of health education in general and means must be found of spreading it even in areas where illiteracy is still prevalent. Close co-operation between FAO, WHO, UNESCO, and other organizations such as the League of Red Cross Societies in work in this field is essential.

The Committee notes that lack of personnel trained in nutrition is still a major problem and recommends that arrangements for "teaching the teachers" should be regarded as a matter requiring urgent attention. Instruction in nutrition, with particular reference to its bearing on their own sphere of work, should be provided for medical officers, public health workers, nurses, agricultural workers, labor officers, welfare workers, teachers (especially teachers of domestic science), caterers, and administrative officers, as all these groups are in a position to influence the successful application of a scientific nutrition policy. Their combined efforts are required to ensure that recommended improvements are introduced and become sufficiently widespread and permanent.

FAO should collect information about educational programs carried out in countries in the region and make this available to other countries drawing special attention to any developments which have led to successful results.

V. THE COMPOSITION OF TROPICAL FOODS

The Committee had before it a "Note on Food Composition" and the FAO publication *Energy-yielding Components of Food and Computation of Calorie Values* (Washington, May 1947). The Committee restricted itself to a discussion of the energy-yielding components. It is in full agreement with the considerations set out in these documents concerning methods of evaluating carbohydrate, protein, and fat. It notes the inconsistencies present in current methods and stresses the necessity for standardization.

The Committee emphasizes the importance of extending food analysis studies and particularly stresses the need for the correct identification, description, and classification of foods. The description of samples analyzed should include not only details of the species and variety and any processing to which the food had been subject, but also as much information as possible regarding the soil, habitat, and other conditions under which the food had been produced. The losses of food occurring between production and consumption (in distribution, processing, storage, and domestic preparation) are also important subjects for study.

The Committee agrees with the recommendation of the Standing Advisory Committee on Nutrition in its Second Report to the Director-General (September 1947) that FAO should prepare food composition tables for international use; the limited application of such tables should, however, be fully recognized. The proposal for the preparation of abbreviated international food composition tables for use in the composition of national "Food Balance Sheets" is also supported by the Committee. In connection with such tables standardization of the terms used to describe "extraction rates" and processing methods is urgently required. For this standardization and the computation of "Food Balance Sheets" it is necessary that Member Governments should supply full data on "extraction rates," etc., at present in use in their respective countries.

The "specific Atwater factors" provide a more scientific basis for the computation of calorie values than the general ones which only apply to diets of a certain type, uncommon in this region. Even for the most important staple foods of the tropics and the Far East, such as rice, maize, and millets, the information available on their digestibility is inadequate to justify a change of calorie conversion factors at the present time. The compilation of studies on the digestibility of proteins, fats, and carbohydrates in tropical and Far Eastern foods, prepared by the Nutrition Division, makes it quite clear that many more such studies should be made with human beings. The Committee recommends this subject to laboratories in this region as a matter which urgently needs investigation. The tests should be made on people who normally consume the foods under investigation and the diets should be prepared and cooked according to local custom. It is emphasized that standard techniques should be used; otherwise the results may be of little value. In these studies priority should be given to cereals, roots, and tubers which usually constitute the greater part of diets in this region.

The Committee recommends that FAO, through National FAO Committees and the Organization's proposed regional office, should collect and disseminate all available data on the chemical composition of tropical and Far Eastern foods. It should stimulate and co-ordinate studies, to be carried out on the lines indicated above, on the composition and physiological value of foods commonly used in this region, and assist in the wide distribution of published material. Such work should be greatly facilitated by the establishment of the FAO regional office.

VI. NATIONAL NUTRITION ORGANIZATIONS OR COMMITTEES

At various FAO conferences the establishment of national nutrition organizations or committees has been recommended and their functions outlined. The Committee is in agreement with the views expressed at these conferences, and holds the view that national nutrition organizations can do much to develop nutrition work in its various aspects in Eastern countries. It is glad to note that, in some of these countries, national nutrition organizations, councils, or committees of various kinds are already in existence. These are in various stages of development and in general much could be done to increase their effectiveness. Their structure, composition, and administrative affiliations will, of course, differ from country to country.

National nutrition organizations should be linked with the regional organization of FAO through National FAO Committees.

VII. REGIONAL ACTIVITIES

The Third Annual FAO Conference recommended that "FAO bring together in each region an appropriate body for the study of nutritional problems within the region." It pointed out that such bodies can "help to develop the nutrition program of FAO within the framework of the organization and will enhance the usefulness of regional offices." It added that "they should be specially concerned with plans for practical action."

The Committee recommends that a committee of experts on nutrition and allied subjects from the various countries in the Indo-Pacific region should be convened annually, the necessary arrangements being made by the FAO regional organization. The relation of the regional nutrition committee to other bodies forming part of the FAO regional organization remains to be decided. Its functions and scope should include the following:

- (a) The discussion of problems of common interest to the various countries, so that information may be pooled and work in the region co-ordinated.
- (b) Reviewing the development of national nutrition programs and the program of the FAO regional organization in this field.
- (c) Advising countries in this region on nutritional questions through the regional FAO organization.

Regional program of FAO

Mention has been made in the present report of numerous nutrition problems calling for study and attack. The most important of these are listed in Appendix A. The recommendations made by this Committee should form the basis of the program to be undertaken by the regional organization of FAO in association with the regional nutrition committee referred to in the previous paragraph.

The approach to the various problems will differ: in some instances the main task of the FAO regional office will be to collect and disseminate information, while other problems involve the organization of joint research projects. The regional office should keep itself fully informed on what is being done in the different countries to follow up the recommendations of this Committee, and keep in close touch with nutrition workers in the region and with regional organizations of specialized agencies of the United Nations. It should provide working papers and secretariat for meetings of the regional nutrition committee.

APPENDIX A

PROBLEMS CALLING FOR STUDY AND ACTION

I. Rice

- (a) Elimination of waste of rice at all stages between production and consumption.
- (b) Improvement of rice (nutrient content, keeping qualities, and acceptability) by the development of better milling practices.
- (c) Development of improved cheap methods of parboiling with the object of producing parboiled rice which will be acceptable to rice-eaters not accustomed to it.
- (d) Enrichment of rice with thiamine, riboflavin, other vitamins, and calcium salts. The value of enrichment as a public health measure.
- (e) Investigation of simple and convenient methods of estimating thiamine in rice.
- (f) Improvement of the nutritive value of rice in connection with variety, cultural conditions, etc.
- (g) Improvement and supplementation of rice diets in the various countries along lines suggested by this Committee.

II. Other Problems and Subjects

- (a) *Food composition.* Collection of available data on the energy value and chemical composition of foods; compilation of food analysis tables; studies of the digestibility by human beings of various foods consumed in the region (rice at different stages of milling, millets, maize, etc.)
- (b) *Nutrition education.* Study and assessment of methods followed in different countries.

The regional office should play an important role in stimulating and co-ordinating work in the region on these and other subjects referred to in this report, or otherwise included in the nutrition program of FAO. The latter include "the technique of dietary surveys" and "the assessment of physiological requirements of calories and nutrients."

APPENDIX B

MEMBERS OF THE NUTRITION COMMITTEE

The following participated in the work of the Committee:

Chairman:

DR. V. N. PATWARDHAN (*India*)
Director, Nutrition Research Laboratories,
Indian Research Fund Association,
Coonoor

Vice-Chairman:

DR. MANUEL L. ROXAS (*Philippine Republic*)
Pilot Plants Technical Consultant,
National Coconut Corporation, Manila

Members:

Burma

DR. MAUNG GALE
Deputy Director, Health Service, Rangoon
MR. J. BHATTACHARJEE
Director, Veterinary Services, Rangoon

China

DR. H. C. HOU
Honorary Director, Nutrition Institute,
Ministry of Health, Shanghai

France

DR. P. DOROLLE
Assistant Director,
High Commissioner's Office of France, Saigon

Netherlands

DR. S. POSTMUS
Director, Eijkman Institute,
Batavia

Philippine Republic

DR. F. O. SANTOS
Professor and Head, Department of Agricultural Chemistry,
College of Agriculture, University of Philippines, Laguna
DR. A. J. HERMANO
Chemist, National Development Company, Manila

Portugal

MR. H. A. MORGADO
Consul of Portugal to the Philippine Republic, Manila

United Kingdom

DR. L. NICHOLLS
Nutrition Adviser to the Special Commissioner,
South East Asia, Singapore

DR. R. C. BURGESS
Senior Nutrition Officer, Institute for Medical Research,
Kuala Lumpur, Malayan Federation

DR. I. A. SIMPSON
Biochemist, Institute for Medical Research,
Kuala Lumpur, Malayan Federation

MISS M. W. GRANT
Assistant to Prof. B. S. Platt,
Department of Human Nutrition,
London School of Hygiene and Tropical Medicine,
University of London

League of Red Cross Societies

DR. J. SALCEDO, JR.
Director of Nutrition, Institute of Nutrition,
Philippine General Hospital, Manila

DR. J. CANUTO
Director, Chapter and Disaster Service Department,
Philippine National Red Cross, Manila

Supreme Commander for the Allied Powers (SCAP)

MISS A. R. O'DONNELL
Nutrition Consultant

United States Army Military Government in Korea (USAMGIK)

MR. I. DESHOTELS
Advisor, Bureau of Agricultural Production,
Department of Agriculture, USAMGIK

United Nations Educational, Scientific and Cultural Organization (UNESCO)

MR. JAN SMID
East Asia Field Scientific Co-operation Office,
Nanking

World Health Organization (Interim Commission) (WHO.IC)

DR. P. M. KAUL
Director, Epidemiological Intelligence Station of WHO,
Singapore

FAO Secretariat

DR. W. R. AYKROYD
Director, Nutrition Division

DR. A. G. VAN VEEN
Nutrition Division



FAO REPORTS RELATING TO NUTRITION

1946—**World Food Survey**, Washington, 5 July 1946. Available in English, French, and Spanish. Price: 35¢

1947—**Energy-yielding Components of Food and Computation of Calorie Values**, Report of a Committee on Calorie Conversion Factors and Food Composition Tables convened by the Nutrition Division in Washington, 24-28 February 1947. Available in English, French, and Spanish. Price: 20¢

Report on Child Nutrition, Prepared for the United Nations International Children's Emergency Fund by a joint committee of the Food and Agriculture Organization and the World Health Organization, Interim Commission, Washington, D. C., 23-26 July 1947. Available free in English, French, Chinese, and Russian from FAO, WHO, and ICEF.

1948—Rice and Rice Diets—A Nutritional Survey. In preparation.

Price 25 cents